AGENDA ITEM J-1

CITY OF LODI
COUNCIL COMMUNICATION

AGENDA TITLE: Approve Plans and Specifications and Authorize Advertisement for Bids for White Slough Water Pollution Control Facility Bio-Solids Dewatering Facility

MEETING DATE: August 4, 2010

PREPARED BY: Public Works Director

RECOMMENDED ACTION: Approve plans and specifications and authorize advertisement for bids for White Slough Water Pollution Control Facility Bio-Solids Dewatering Facility.

BACKGROUND INFORMATION: The City has made substantial progress on the State-mandated improvements at the White Slough Water Pollution Control Facility (WSWPCF). One of the final improvements to be made, as recommended in the 2001 White Slough Master Plan, is the addition of bio-solids dewatering facilities.

As a result of the 2007 Waste Discharge Permit requirements and the recent treatment plant upgrades, nitrate levels have been significantly reduced in the land-applied effluent and bio-solids. However, the treatment plant has for many years produced more bio-solids than can be properly applied to the agricultural fields, causing elevated nitrate levels in the storage ponds and in the shallow groundwater below portions of the land application areas. Bio-solids storage capacity is limited and the proposed dewatering facilities will allow for removal of 500 to 1,000 tons annually that will be hauled to a regional landfill. Additional operational goals include:

- Even distribution of bio-solids on the land application areas;
- Providing additional bio-solids storage capacity, thereby eliminating supernatant discharge to storage ponds; and
- Providing the capability to remove one bio-solids storage lagoon from service to perform maintenance while the plant remains in operation.

Bio-solids contain nitrogen and other nutrients that are beneficial to crop growth and, if managed properly, can reduce the need for commercial fertilizers applied to the fields. However, if any fertilizer is applied at rates in excess of plant nutrient uptake (the agronomic rate), excess nitrogen can move into shallow groundwater. Although the City attempts to apply liquid bio-solids at or below agronomic rates, the process inherently results in the over-application at the head end of the fields and under-application at the tail end of the fields, as illustrated in Figure 1 of the attached Technical Memorandum. Figure 1 shows a dark green (healthier) crop located at the head end (near the blue line) of the fields and a light green (nutrient deficient) crop at the tail end of the field. Dewatering of the bio-solids produces a "cake" that can be mechanically and evenly spread across the fields. If disposed of at a landfill, State regulations require that bio-solids be dewatered. It is expected the future discharge permit requirements will address these field application and offsite disposal issues.

APPROVED: _____
Konradt Bartlam, Interim City Manager

The facility will consist of dewatering equipment, two skid-mounted rotary fan presses, and chemical feed equipment. Appurtenant facilities will include piping, pumps, electrical controls, and covered bays for the storage of dewatered sludge. City Council authorized the design of the facility in June 2009; that was completed in 2010. Funding for the project, $5,100,000, is available from the 2007 Certificates of Participation issued for the Phase 3 improvements at WSWPCF. A contract award must be made by December 2010 or these funds must be paid back to the bond holders.

The WSWPCF Master Plan developed prior to the 2003 Phase I Improvements project acknowledged that bio-solids dewatering, storage, and distribution to the land may become an issue during future permit applications and discussed the dewatering facility.

Council is being asked to approve the plans and specifications and authorize advertisement for bids for the project. A prequalification process is included to determine eligible bidders and ensure contractors have the necessary experience to perform the work.

The plans and specifications are on file in the Public Works Department. The bid opening date will be in October 2010.

FISCAL IMPACT: Operations and maintenance costs will increase by approximately $265,000 per year, including the costs for equipment operation and maintenance, chemicals, seasonal land spreading, and wintertime off-site transportation and disposal of approximately 900 dry tons of bio-solids each year.

FUNDING AVAILABLE: This project will be funded by the Wastewater Fund (172) using the remaining 2007 Certificates of Participation (approximately $5,100,000).

F. Wally Sandelin
Public Works Director

Prepared by Gary Wiman, Construction Project Manager
FWS/GW/pmf
Attachment
cc: Charles Swimley, Deputy Public Works Director – Utilities
Del Kerlin, Wastewater Treatment Superintendent

WEST YOST ASSOCIATES 20 years

TECHNICAL MEMORANDUM

DATE: July 21, 2010 Project No.: 213-04-09-23

TO: Mr. Charlie Swimley, Jr. P.E
City of Lodi

FROM: Kathryn Gies, R.C.E. #65022 Reviewed By: Ken Loy, PG

SUBJECT: Biosolids Dewatering Facility Recommendations

This Technical Memorandum (TM) provides a discussion of the reasons the City of Lodi should consider constructing a biosolids dewatering facility at the City's Water Pollution Control Facility (WPCF). The City's current practice for biosolids disposal involves mixing the liquid biosolids with recycled water and applying this "slurry" to the land application area via the flood irrigation system. (As discussed further below, the City has also recently had to retain the services of an outside contractor to remove, dewater and haul offsite a portion of the biosolids during the winter months.) The current land application practice has the potential to cause odor problems at the WPCF and to allow unacceptable amounts of nitrogen to migrate into the groundwater. These concerns are further detailed below. Future offsite hauling of biosolids will also be more expensive if the City does not construct a dewatering facility.

WHY DEWATERING

Dewatering often is a process used in preparing biosolids for land application. This is because dewatering decreases biosolids volume and weight by removing some of the water content. For facilities that use trucks to distribute biosolids on land application areas, dewatering results in transportation costs that are significantly decreased. Dewatering also makes handling of the biosolids easier because it converts the liquid biosolids to a damp cake. The biosolids "cake" can then be evenly distributed onto field areas using spreader trucks, which can then be incorporated into the soil – thus avoiding the potential for nitrogen overloading and odor generation.

Using trucks to distribute liquid biosolids is also an option to evenly spread the material over a field area; however, for Lodi the number of truckloads needed to distribute the liquid biosolids would be substantial and costly. West Yost Associates is not aware of any facility in the Central Valley that is the size of Lodi (or larger) that currently land applies liquid biosolids, and we believe this is in part due to the high cost of transporting the liquids.

Dewatering also is a necessary treatment step for biosolids that are disposed of in landfills. Therefore, the construction and operation of a dewatering facility will allow the City to dispose of solids offsite in the event that such practices are necessary. For the City, the following factors may require off hauling biosolids in the future: the need to reduce loadings to the agricultural fields; the need to remove solids from the lagoons due to limited winter-season storage capacity; and/or a prohibition on land application of biosolids on the City's property. Although a prohibition of biosolids land application is not currently anticipated, there are a number of potential reasons specific to the WPCF that could result in a prohibition such as: the land application site experiences high groundwater levels, a portion of the area is subject to flooding, and the entire area is located within the legal boundary of the Sacramento-San Joaquin Delta.

GOOD MANAGEMENT PRACTICES (GMPS)

The City's permit states that the "Discharger is encouraged to comply with the "Manual of Good Practice for Agricultural Land Application of Biosolids" (California Water Environment Association, 1998). The Manual provides a summary of the applicable regulatory requirements and recommended Good Management Practices (GMPs) for biosolids land application. The City would be able to readily comply with all of the recommended GMPs, if dewatered solids were applied to the land application area.

With the current application method, the City can generally comply with most of the recommended GMPs. However, there are two important exceptions. The very nature of the City's application practices result in ponding at the heads of the fields where solids are applied. Moreover, following a land application event, the ground is too moist for equipment to enter the field areas to incorporate the biosolids. Therefore, the City is not able to practice the GMP of minimizing ponding of applied liquid solids, or the GMP of incorporating the biosolids into the soil as soon as possible after application.

Both of the above mentioned GMPs are recommended to minimize adverse impacts associated with odors, improve site aesthetics, and increase public acceptance. As development around the WPCF land application area increases, odor control and public acceptance of the City's practices will become an even more important issue.

GROUNDWATER PROTECTION

One of the greatest advantages associated with the land application of biosolids is the reduction in the amount of commercial fertilizers that must be used. Biosolids contain nitrogen (as well as phosphorus and many micronutrients that can be beneficial to crop growth) that is released slowly over time. However, as with any type of fertilizer, if biosolids are applied at rates in excess of plant nutrient uptake, excess nitrogen can move into groundwater. Although the City strives to apply the liquid biosolids at a rate that is appropriate to meet the crop's nitrogen need, the application of biosolids "slurry" using the City's flood irrigation system inherently results in the potential for over application at the head of the fields and under application at the tail of the fields. This uneven application also poses problems for the farmers that lease the City's property, as some crops do not receive the amount of nutrients needed for proper growth (see attached Figure 1).

The City is currently working to complete a Background Groundwater Characterization Report in accordance with the City's permit. Based on an initial review of the data, it appears that the nitrate concentrations in one of the wells within the land application area exceed the background concentrations. This well is located near the head end of a field that has received biosolids over the last 5 year period. There also appears to be a connection between when the nitrate concentrations started to be elevated in this well and the when the adjacent field started receiving biosolids.

Finally, the City historically allowed the discharge of biosolids supernatant to the storage ponds. In an effort to provide "Best Practicable Treatment and Control" for the supernatant, the City began the practice of directing the supernatant flows to the WPCF for additional treatment in July 2008. This modification has significantly reduced supernatant discharges to the storage ponds. A review of groundwater and pond data collected before and after this change confirms that this practice has significantly improved groundwater quality at the WPCF.

However, the City was forced to send the overflow from the biosolids lagoon to the storage ponds for 21 days in January 2009, because the sludge lagoon had reached its capacity. The overflow of supernatant for just this short period *significantly increased nitrogen concentrations in the storage ponds.* Therefore, the City brought a second sludge lagoon online to increase the storage capacity. In addition, the City retained the services of an outside contractor to remove, dewater and haul offsite excess solids during the winter months to avoid overflow.

In 2010, the City paid this contractor to dewater and haul offsite 246 dry tons of biosolids (approximately 1/3 of the total volume of solids that have historically been land applied) from the WPCF site. (This amount of biosolids weighed 1,207 tons when hauled offsite. It would have weighted 4,920 tons without dewatering.)

Figure 1. Irrigation Water Flow Schematic for a Portion of the City-Owned Irrigation Area

City of Lodi

Water Pollution Control Facility

Biosolids Dewatering Facility

August 4, 2010

Presentation Outline

- Background
- Current Land Application Practices
- What is Biosolids Dewatering?
- Regulatory Considerations
- Cost and Schedule

FACTS

- WSPCF produces more biosolids than can be properly handled
- Background Groundwater Report indicates facility has impacted shallow groundwater
- Facility is located in very sensitive area
- Prohibition of biosolids application possible
- Available funding and bidding climate is right

Staff Recommendation

- Approve Plans and Specifications and Authorize Advertisement for Bids for the WSPCF Biosolids Dewatering Facility
  - Constructed at White Slough
  - Consist of 2 rotary fan presses and required processing equipment
  - 3 covered storage bays (23,000 SF)
  - Provides 2 months of storage at 8.5 mgd

History

- 1976 – Improvement project included dewatering facility – not constructed
- 2001 – WSPCF Master Plan noted bio-solids handling deficiencies – recommended improvements
- June 3, 2009 – Council Authorized Design of Biosolids Dewatering Facility $ 198,000
- September 23, 2009 – Environmental Document Certified
- March 3, 2010 – Council voted not to approve plans and specifications
- June 15, 2010 – Permit Update presentation discussed benefits/necessity of dewatering

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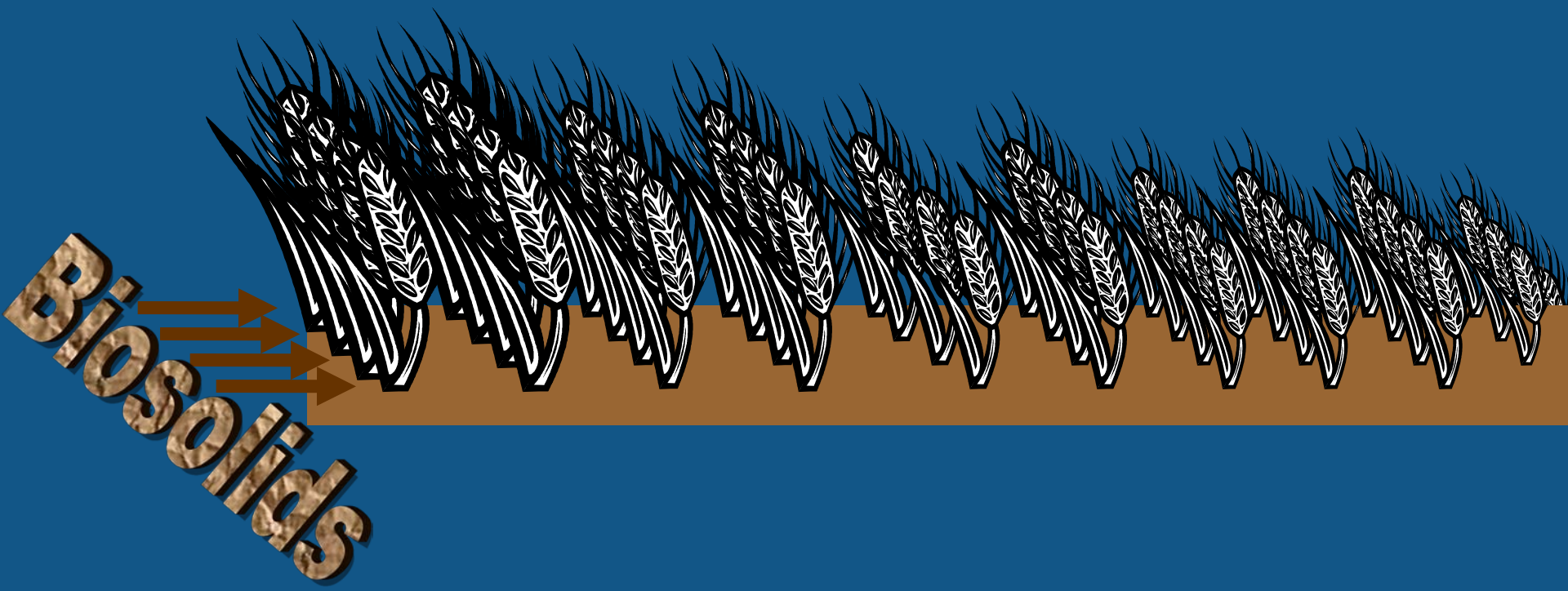
Land Application Facilities

Application of Liquid Biosolids Causes Excessive Loading of Nitrogen At One End of the Agricultural Fields



Uneven Crop Growth

(Aerial Photo - July 2010)

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Biosolids Before Dewatering

Dewatering Press

Biosolids “Cake”

(“You can have your cake and eat it too!”)

Bio-Solids Spreading

- Even Application of Nutrients
- Controlled Application Rates

Landfill Disposal

Proposed Dewatering Facility Location

Outside Dewatering Services
(Not Recommended)

- City Contracted for 500 Dry Tons in 2009
  - ~250 Dry Tons Removed
- Not very efficient
  - Optimization takes time
- Cost : $430 / Dry Ton
  - Processing
  - Off-site Disposal

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- **Regulatory Considerations**
- Cost and Schedule

Regulatory Considerations

- Background Groundwater Report
  - Nitrate and EC shown to exceed background
- Land Application Practices Report
  - Required to demonstrate Basin Plan compliance (and Title 27 exemption)
- Good land application practices Critical
- Potential for Prohibition
  - High Groundwater
  - Proximity to Delta

Presentation Outline

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- **Cost and Schedule**

Proposed Dewatering Facility Cost

- Estimated Construction Cost: $5,100,000
  - 2 rotary fan presses
  - 3 covered storage bays (2 months storage)
  - Electrical controls, piping and pumps
  - Includes inspection and in-house CM services

- Estimated Annual Operating Cost: $265,000
  - Staff time, chemicals, energy,
  - Wintertime disposal (~1000 DT)
  - Land spreading (~800 DT)

Schedule

- Bid Opening: October 2010
- Start Work: December 2010
- Start Up: July 2011

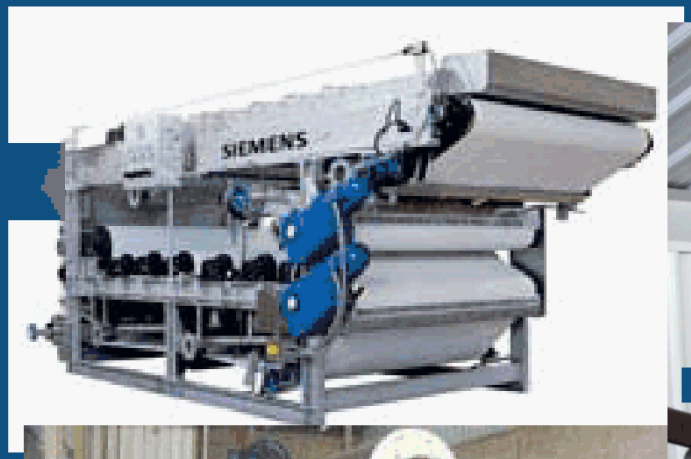
Why Dewatering ?

- Generate > Dispose
  - It will get worse, never better
- Enhanced Operational Control
  - Even Application, accurate accounting, healthier crops,
  - Off-Haul during winter
  - Preserves water quality of storage ponds
- Regulatory Pressure
  - State Board Order
  - Potential for bio-solids prohibition
  - Studies show nitrate, EC exceed background
- Pay Now or Pay Later
  - Great bidding climate
  - Current debt service includes project cost

Questions?

State Board Order

- Groundwater Background Report is complete – Submitted July 30th.
  - After Regional Board review – Permit revisions will move forward
- Lodi will be required to prepare a Land Application Practices Report to demonstrate compliance with Title 27
- Settlement Negotiations are in progress between CVCWA and State Board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